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NOTES ON GEOGRAPHIC DISTRIBUTION

Amphibia, Anura, Centrolenidae, *Centrolene daidaleum* (Ruiz-Carranza and Lynch, 1991): First record for Venezuela, new altitudinal record, and distribution map

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ABSTRACT: The glassfrog *Centrolene daidaleum* is considered endemic to the Cordillera Oriental of the Colombian Andes, and is known only from eight localities between 1,600 and 2,060 m, on the western slope of this mountain system. Herein we report the first record of this species from Venezuela based on specimens coming from the Sierra de Perijá, Zulia state. The species' altitudinal range is extended, and some ecological information is provided.

The glassfrog *Centrolene daidaleum* (Figures 1 and 2) was originally described as *Cochranella daidalea* and assigned to the *Cochranella granulosa* species-group by showing pale green bones in life, white parietal and visceral peritonea, granular dorsal skin, and external crenulated skinfolds on forelimbs and hindlimbs (Ruiz-Carranza and Lynch 1991). New molecular data by Guayasamin *et al.* (2009) led to the reassignment of this species to the genus *Centrolene*. This reassignment is also supported by eight of the nine morphological diagnostic characters of the recently redefined genus *Centrolene*. The lack of humeral spines in adult males of *C. daidaleum* (and *C. savagei*) is the principal exception from the generic diagnosis.

Centrolene daidaleum is considered endemic to the Cordillera Oriental of the Colombian Andes, and known only from eight localities between 1,600 and 2,060 m (Figure 3). The type-locality of the species is: Granja Infantil del Padre Luna, Vereda Las Marías, municipio de Albán, departamento de Cundinamarca, western slope of the Andean Cordillera Oriental, Colombia, at 2,060 m (Figure 3; Ruíz-Carranza and Lynch 1991). The original description reported four additional localities at departamento de Santander (Colombia), between 1,630 and 1,750 m (Río Cañaverales, Cerro El Rayo, and Río Guillermo in municipio de Charalá; and Vereda Caragua, 4 to 5 km towards Tona, municipio de Tona). Daza and Barrientos (2005) reported *Centrolene daidaleum* from departamento del Cesar, Colombia (municipio de González, Vereda San Cayetano, 1600 m); Rada *et al.* (2007) recorded four adult males and described the tadpoles of this species, at departamento Norte de Santander, Colombia (municipio de La Playa de Belén, Vereda Piritama, Quebrada Piritama, 1,800 m), and recently Rada and Guayasamin (2008) reported it from departamento de Boyacá, Colombia (municipio de Moniquirá, Vereda El Ajizal, 2,050 m).

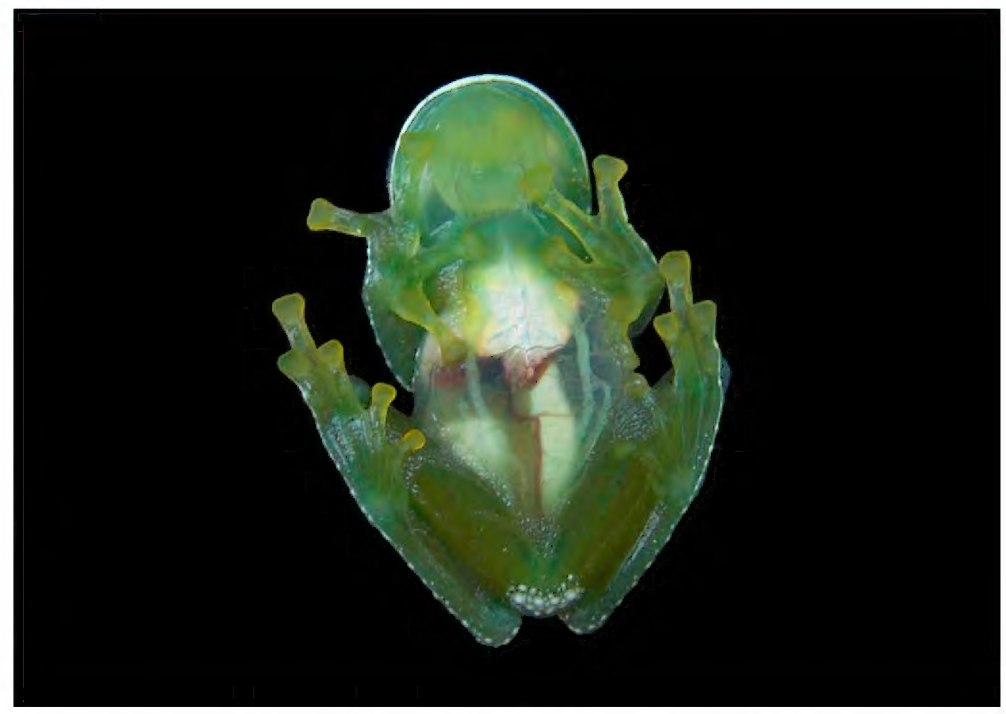

FIGURE 2. Ventral view of an adult male of *Centrolene daidaleum* from the Sierra de Perijá, Venezuela (Photo: P. Velozo).

FIGURE 1. Lateral view of an adult male of *Centrolene daidaleum* from the Sierra de Perijá, Venezuela (Photo: F.J.M. Rojas-Runjaic).

Herein, we report the first records of this species from Venezuela. Specimens were collected at five localities during several surveys of the inventory of amphibian and reptiles of Perijá, conducted by Museo de Historia Natural La Salle (MHNLS), and Museo de Biología de La Universidad del Zulia (MBLUZ), from 2006 to 2009. Collecting permits

#01-03-03-1146 (period 2005-2006), #01-03-03-3649 (period 2006-2007), #4100 (period 2007-2008), and #4750 (period 2008-2009) were issued by Ministerio del Poder Popular para el Ambiente of Venezuela. Expeditions to Río Negro and Río Tokuko basins (Parque Nacional Sierra de Perijá) were benefited with permit of the Venezuelan Instituto Nacional de Parques (PAA-215-2008) issued to Fernando J. M. Rojas-Runjaic.

The first specimen (MBLUZ 345) was found at Quebrada El Gocho, Fundo El Progreso, Río Socuy upper basin, municipio Jesús Enrique Lossada, estado Zulia (10°47'00" N, 72°26'00" W, *ca.* 800 m), on 25 February 2006 at 20:00 h, calling actively on a leaf of a bush *ca.* 1.5 m above water. Six specimens were collected at Cerro Las Antenas (Río Lajas basin), municipio Rosario de Perijá, estado Zulia, between 27-29 March 2008; four (MHNLS 18855-18857, 18863) at a creek near base camp (10°20'37" N, 72°33'41" W, *ca*. 1430 m), and two (MHNLS 18890-18891) at a creek near last antenna (10°19'40" N, 72°35'27" W, *ca*. 1832 m). Ten specimens were collected at Manastara valley, near indigenous community of Manastara, Río Negro basin, municipio Machiques de Perijá, estado Zulia (10°02'52" N, 72°48'43" W, *ca*. 1130 m), between 17-18 March 2009; two at a creek draining to Río Negro (MHNLS 19114-19115), and eight in the main course of the river (MHNLS 19122-19129). And finally, four specimens were collected at Río Tétari Kopejoacha, near Campamento Guacharaca, Río Negro upper basin, municipio Machiques de Perijá, estado Zulia (10°04'22" N, 72°51'16" W, ca. 1661 m) between 21-27 May 2009. These new records from the Venezuelan Sierra de Perijá (Figure 3) extend the species distribution by *ca*. 295 km NNE (straight-line) from the previous north-easternmost locality (Quebrada Piritama; Rada *et al.* 2007). The species altitudinal range is also extended to 800–2,060 m; with the lower limit being significantly extended (previously recorded at 1,600 m, Vereda San Cayetano, Colombia; Daza-R and Barrientos 2005).

Besides the collected specimens of *Centrolene daidaleum*, numerous individuals were observed and heard in the creeks and rivers sampled. Highest abundance was detected at Manastara, with 31 individuals detected in a 100-m transect along the main river course; being the most abundant amphibian species at the locality. In the creek near base camp of Cerro Las Antenas, eight specimens were detected in an 80-m transect, being the third most abundant amphibian species. However, at two localities with highest altitude in Perijá (Campamento Guacharaca and creek near last antenna in Cerro Las Antenas), *C. daidaleum* was scarce (four and two specimens respectively), and the less abundant amphibian species. In all localities (except Quebrada El Gocho) *Centrolene daidaleum* was sympatric with other glassfrogs species; with *Hyalinobatrachium* sp. at Cerro Las Antenas; with *Espadarana andina* (Rivero, 1968) and *Hyalinobatrachium* sp. at Manastara valley; and with *Hyalinobatrachium* sp. and "*Centrolene*" sp. at Río Tétari Kopejoacha.

Centrolene daidaleum has been recorded in Colombia from streams in premontane forest, cloud forest, and even secondary forest on the western slope of Cordillera Oriental (Ardila-Robayo and Rueda 2004). The five new Venezuelan localities are also in premontane, montane and cloud forests. Almost all small rivers were surrounded

FIGURE 3. Geographic distribution map of *Centrolene daidaleum*. Dots numbered from 1-5: New locality records from the Sierra de Perijá, Venezuela. 1. Quebrada El Gocho, Fundo El Progreso, Río Socuy upper basin; 2. Creek near base camp of the Cerro Las Antenas, Río Lajas basin; 3. Creek near last antenna, cerro Las Antenas, Río Lajas basin; 4. Indigenous community of Manastara, Río Negro basin; 5. Río Tétari Kopejoacha, Campamento Guacharaca, Río Negro basin. White dots: localities recorded from Colombia (Ruiz-Carranza and Lynch 1991; Rada et al. 2007; Rada and Guayasamin 2008; Daza and Barrientos 2005). White rhomb: type locality (Ruiz-Carranza and Lynch 1991).

by primary forest, with high humidity, abundant ferns, and Heliconiaceae, Araceae and Cyclanthaceae plants on the sides (Figure 4). Frogs were frequently calling and nesting on ferns above the water. At Manastara, frogs were found on shrubs and coffee plants (*Coffea arabica*) along the main course of the river, in secondary forest associated to shaded coffee plantations. Manastara was the only locality where *Centrolene daidaleum* was the dominant amphibian species, suggesting that *C. daidaleum* may proliferate in disturbed environments.

While Centrolenid glassfrogs are usually restricted to relatively small distributional areas, *Centrolene daidaleum* exhibits an unusually large distribution (685 km between the northernmost and southernmost localities). Venezuelan and Colombian populations of *C. daidaleum* are indistinguishable (based on description by Ruiz-Carranza and Lynch 1991), but further studies (including calls and molecular data) may be required in order to discard the possibility of cryptic lineages within *C. daidaleum*. Furthermore, the occurrence of *Espadarana andina* in Venezuelan Sierra de Perijá (another glassfrog widely distributed on Cordillera Oriental of Colombia and Cordillera de Mérida of Venezuela; La Marca *et al.* 2004; Señaris and Ayarzagüena 2005), suggests the possibility of future findings of other Colombian glassfrog species in the Venezuelan Sierra de Perijá.

Centrolene daidaleum was classified as Vulnerable in the IUCN Red List of Threatened Species, because its extent of occurrence was less than 20,000 km^2, its distribution was reported as severely fragmented, and there was a continuous decline in the extent and quality of its habitat in Colombia (Ardila-Robayo and Rueda 2004).

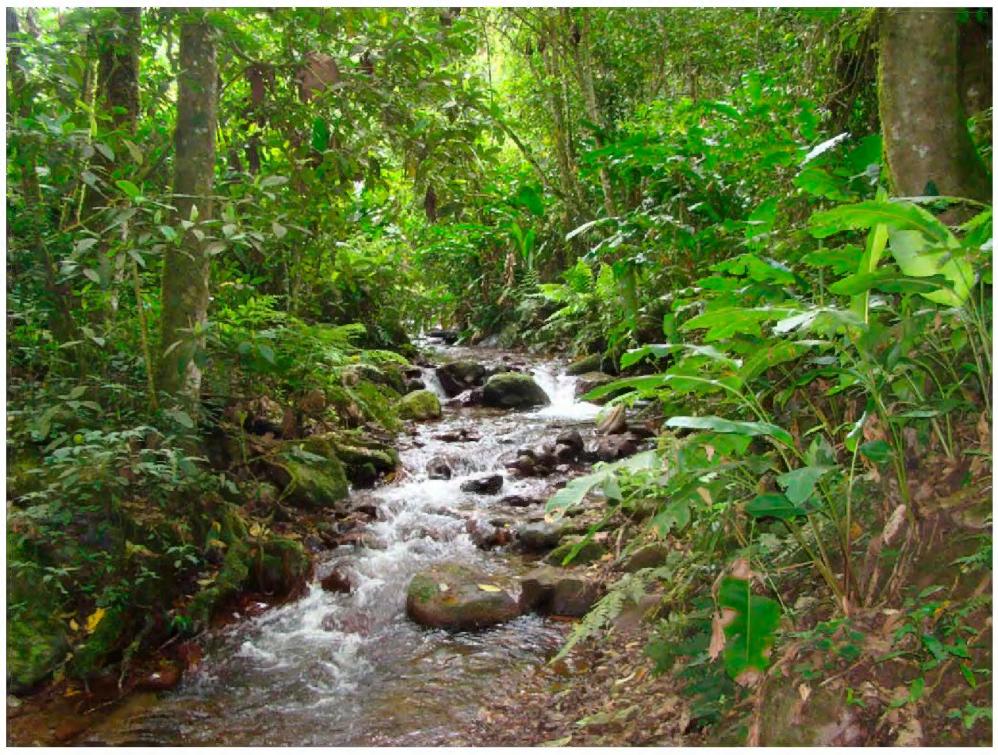

Figure 4. Habitat where *Centrolene daidaleum* was found at Campamento Guacharaca, Río Tétari Kopejoacha, Sierra de Perijá, Venezuela (Photo: F.J.M. Rojas-Runjaic).

However, the new localities in the Venezuelan Sierra de Perijá significantly increase its distribution, indicating that the species has an extent of occurrence much wider than previously known. Two Venezuelan populations (Manastara and Campamento Guacharaca) occur inside the Parque Nacional Sierra de Perijá. A reassessment of the conservation status of the species is required in order to include new data.

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